

(No Model.)

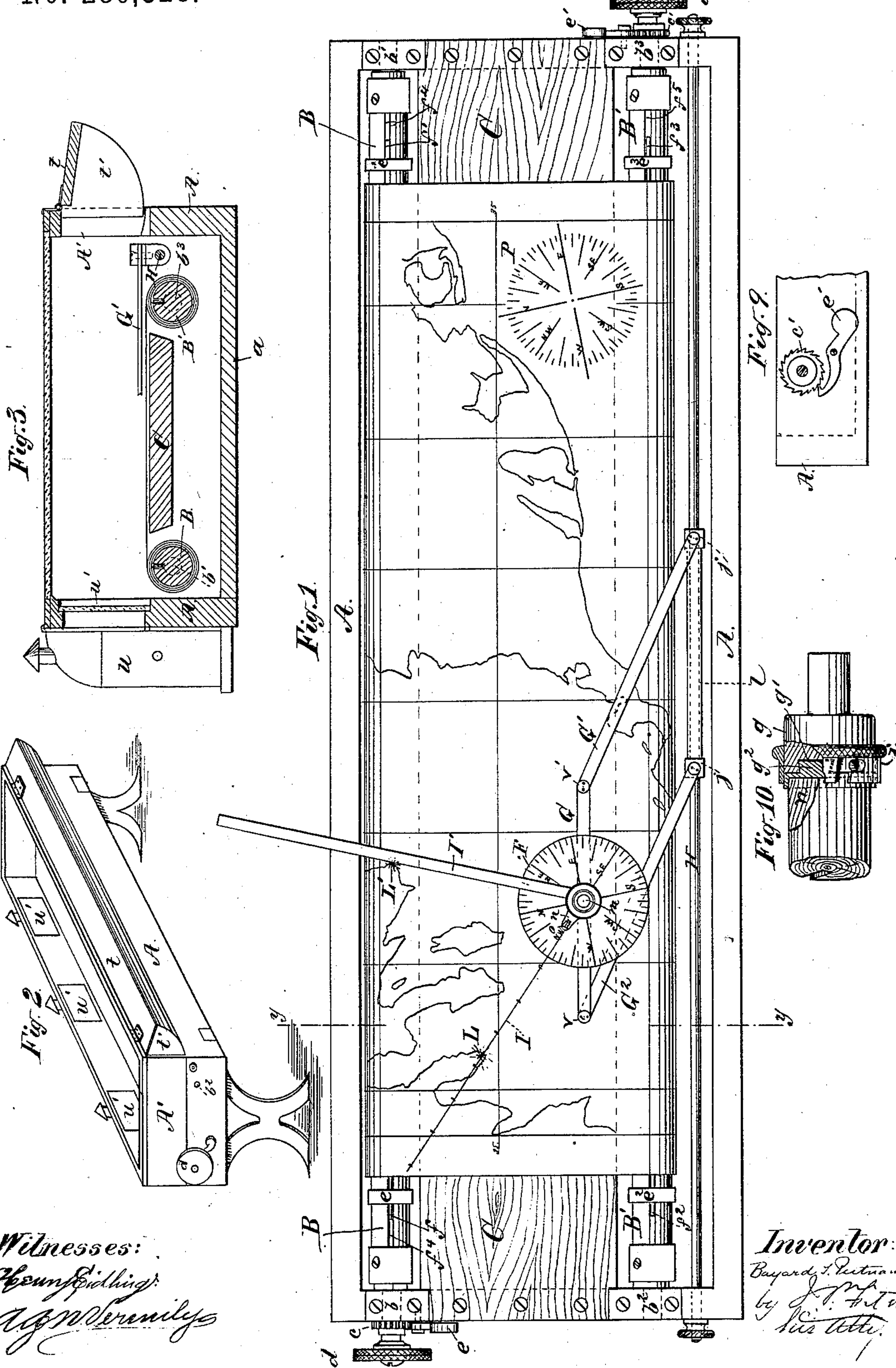
2 Sheets—Sheet 1.

B. T. PUTNAM.

COMBINED PROTRACTOR AND CHART HOLDER.

No. 280,328.

Patented June 26, 1883.



(No Model.)

2 Sheets—Sheet 2.

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Fig. 4.

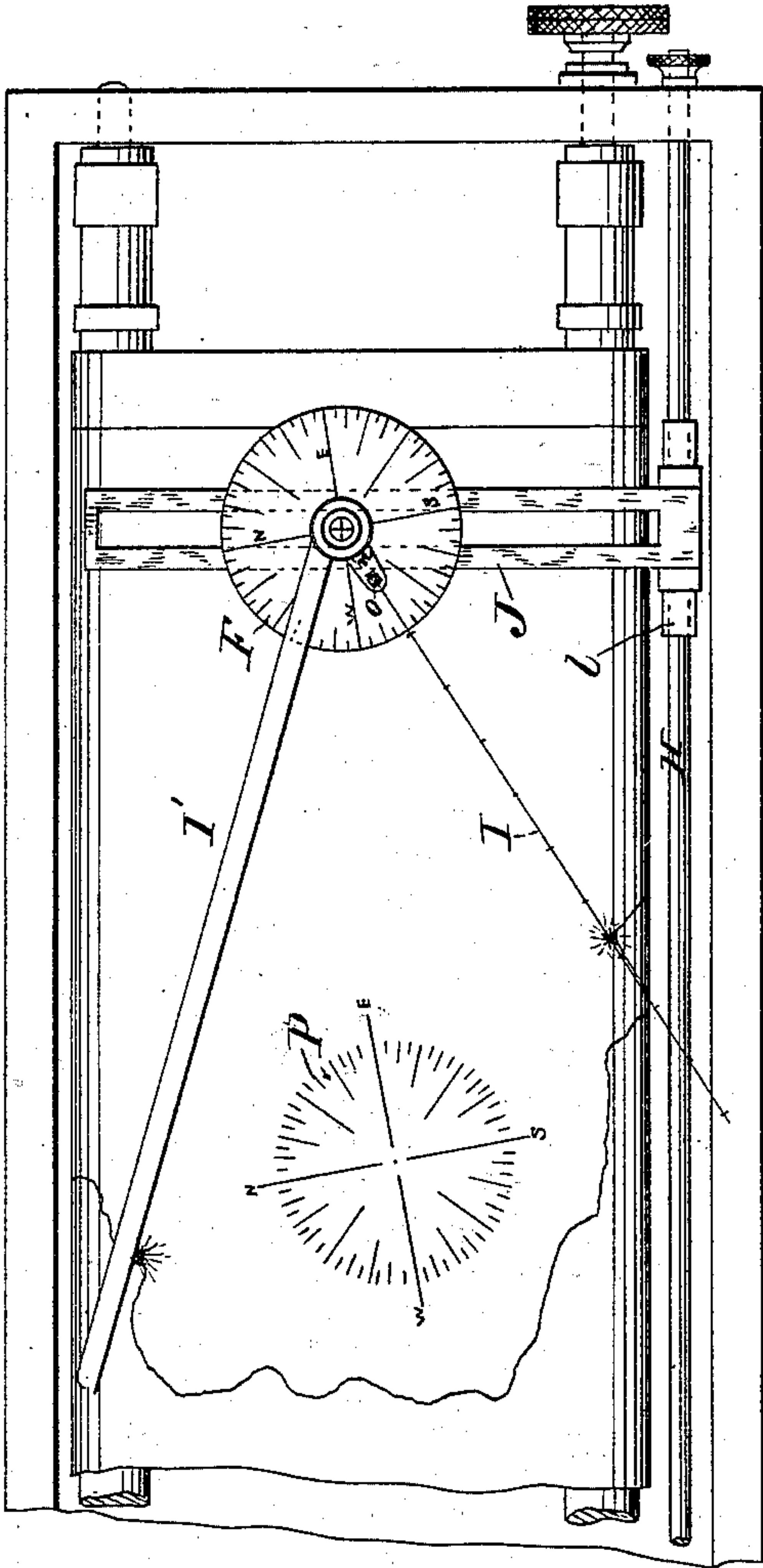


Fig. 6.

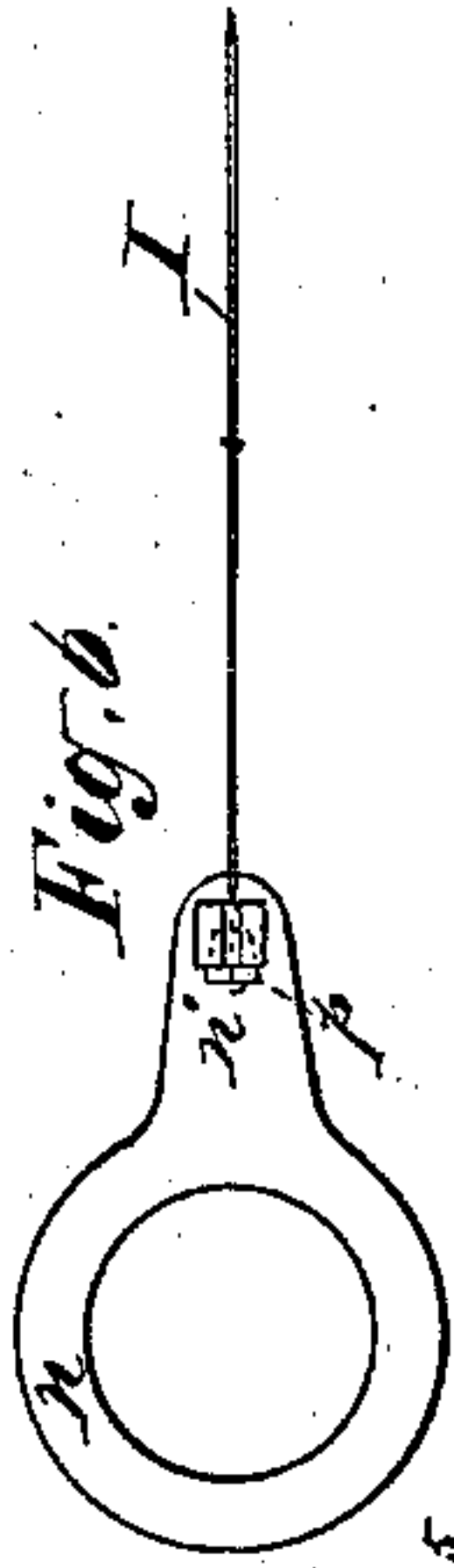


Fig. 7.



Fig. 8.

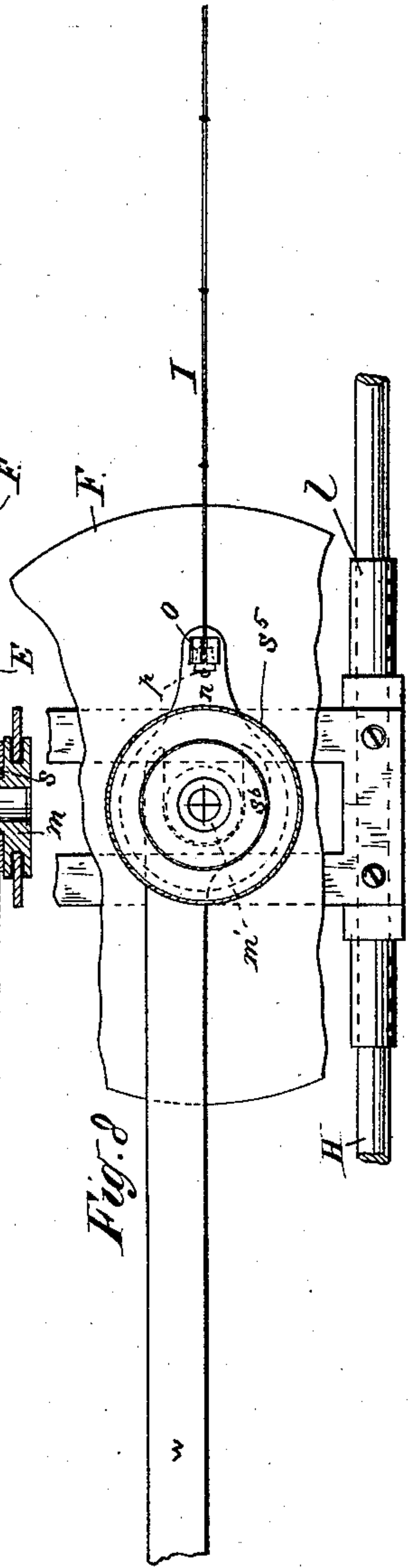
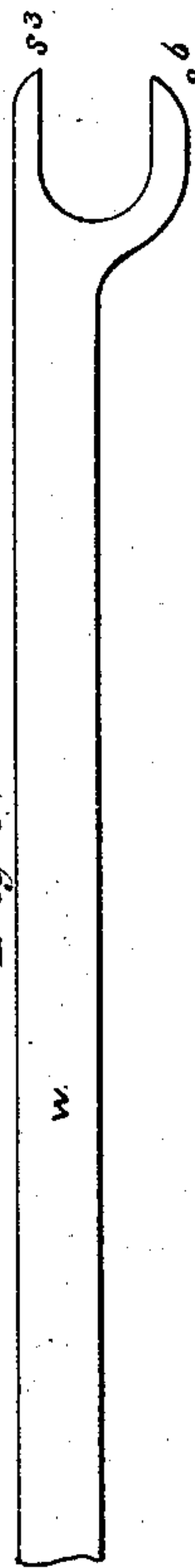


Fig. 5.



Witnesses:

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his atty



# UNITED STATES PATENT OFFICE.

BAYARD T. PUTNAM, OF NEWPORT, RHODE ISLAND.

## COMBINED PROTRACTOR AND CHART-HOLDER.

SPECIFICATION forming part of Letters Patent No. 280,328, dated June 26, 1883.

Application filed March 29, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, BAYARD T. PUTNAM, residing at the city of Newport, in the county of Newport and State of Rhode Island, have invented a Combined Protractor and Chart-Holder, of which the following is a specification, reference being had to the accompanying drawings, forming part of the same, in which—

Figure 1 is a plan of a combined protractor and chart-holder embodying my invention. Fig. 2 is a perspective view, on a smaller scale, of the chart-holder, together with a cover to the same. Fig. 3 is a cross-section on line *y y*, Fig. 1. Fig. 4 is a plan view of a detached part of the said holder, and showing a modified form of the protractor-guide. Fig. 5 is a plan view of a straight-edge to be used on the protractor. Fig. 6 represents a tape or string and holder used on the protractor. Fig. 7 is a central vertical section of the protractor and its attachments. Fig. 8 is a detached fragmentary view, on a larger scale, of the protractor, the protractor-guide, straight-edge, string-holder, and string; and Fig. 9 is a detail view of a piece of the frame, showing the ratchet and pawl. Fig. 10 is a detail.

The special object of my invention is to provide navigators with an apparatus for the ready and convenient display of their charts, in connection with a movable and guided protractor for the ready and convenient measuring and taking off of angles, laying of courses, getting the bearings of distant objects, finding the location of the vessel, &c. My object is likewise to provide a convenient instrument, whereby a chart while being held, in combination with a protractor, within limits narrower than its entire width, may be readily shifted so as to display any desired portion of it. I also provide means whereby, while the chart is so displayed, it is lighted and protected from the elements, so that it may be used, if desired, on the open deck in the night and in stormy weather.

I will proceed to describe, first, the frame and rollers which constitute the chart-holder.

A indicates a frame, preferably having a close bottom, *a*.

B and B' are two longitudinal rollers, one on each side of the frame, and turning on bearings in its ends at *b b'* *b<sup>2</sup> b<sup>3</sup>*.

C is a tablet, having its ends resting on and secured to the upper edges of the ends of the frame, so that its upper face is on a level, or

nearly so, with the upper sides of the rollers. The tablet is less in width than the frame, leaving between its edges space for the rollers, as shown plainly in Fig. 3. One of the journals of each roller extends through the frame, the extended journals being preferably at opposite ends of the frame. On these journals, outside of the frame, are fixed toothed or ratchet wheels *c c'*, and *e* and *e'* are counterbalanced pawls, one in each end of the frame, arranged to take into the teeth of said wheels *c c'*, so as, when engaged, to prevent the roller from rolling over toward the interior of the frame, and allowing it to roll in the opposite direction. The outer ends of the pawls are weighted, as shown, to keep the pawls in engagement with the toothed wheels, as seen in Fig. 9. Each roller is provided with such a toothed wheel and pawl. On the ends of these journals are also fixed milled wheels *d d'*, for convenience in rotating the rollers with the thumb and finger. Upon the rollers is mounted a chart, the upper and lower edges of the chart being attached to the rollers, respectively, in any suitable manner. I preferably attach them in the manner shown in the drawings at Figs. 1 and 2. This consists in forming closed folds in the upper and lower edges of the chart, and placing in the folds narrow flat rods, preferably of sheet metal, with their ends *f f'* *f<sup>2</sup> f<sup>3</sup>* extending a little beyond the side edges of the chart. This fold, containing the rod, I force edgewise into narrow grooves cut in the faces of the rollers *f<sup>4</sup> f<sup>5</sup>* from end to end. Then by a single turn of the roller, winding onto it the chart, the fold and rod are secured in place. For additional security, and to permit the chart to be entirely unrolled without pulling the looped edges out of the grooves in the rollers, loose rings *e<sup>2</sup> e<sup>3</sup>* *e<sup>4</sup> e<sup>5</sup>* on the rollers may be provided to slip over the ends *f f'* *f<sup>2</sup> f<sup>3</sup>* of the rods. As is evident, a chart thus mounted may be readily shifted from one roller to the other at pleasure, thus bringing into view any portion of the chart that may be desired, and readily stretching it smooth upon the tablet.

For convenience in removing one chart from the frame and putting in another, the rollers, if preferred, may be made detachable from the journals, and coupled to them by any suitable coupling devices. Such a device is shown in Fig. 10. The journal carries on its inner end a head, *g*, formed of metal, on the outer face of which is a transverse wedge-shaped dove-



tailed recess,  $g'$ . On the adjacent end  $h$  of the roller is a metal socket, the face of the end of which has a rib,  $g^2$ , corresponding to the recess  $g'$ . The two parts are coupled together by passing the rib into the recess, and thus adjusting the roller between heads  $g$  at each end of the frame. The roller is then locked in place by a ring,  $i$ , at each end, which is slipped over the joint and secured by a bayonet-lock, as shown, the notch in the ring engaging with a stud fixed in the socket on the roller. By these means the unwinding of the chart from the rollers when a change of charts is desired is obviated, each chart being provided with its own rollers, to which, if preferred, it may be permanently attached, may be removed, together with its rollers, from the frame and replaced by another.

The following is a description of the adjustable protractor and its connection with the described chart-holder:

F is the protractor, marked to correspond with the mariner's compass. It is made preferably of a thin plate of glass, horn, or some analogous transparent or translucent material. This is mounted on the parallel rules  $G$   $G'$   $G^2$ , pivoted together at  $v$   $v'$ , and jointed at  $j$   $j'$  to a sleeve,  $l$ , that is fitted to slide on a rod,  $H$ , fixed in the frame  $A$ , as shown fully in Fig. 1. The rod may be secured in the frame, so as to be readily removed therefrom, by passing it through holes in the ends of the frame, and providing the ends that extend beyond the frame with screw-threads and nuts. Fixed in the center of the rule  $G$  is a hollow externally-screw-threaded stud,  $m'$ , which projects outward through a central hole in the protractor. A thumb-nut screwed onto the stud adjustably fastens the protractor on the rule.  $n$  is a measuring-thread or tape-holder, (shown on a large scale in Fig. 6,) which consists of a flat ring, from one side of which projects an arm,  $n'$ , on the end of which is fixed a short open tapering tube,  $o$ , that has a slotted opening in its outer side.

$I$  is a thread or tape, on one end of which is secured a short tapering plug,  $p$ , which fits into the tube  $o$ , when passed into it from the inner end of the same outward, the thread at the same time passing down through the slotted opening in the tube. By these devices the thread may be attached to and detached from the arm  $n'$  at pleasure. The ring  $n$  is placed on the stud  $m'$  and rests down upon the protractor. In order that it may be free to turn on the stud, while at the same time the protractor is gripped between the thumb-nut and the rule  $G$ , a washer,  $s^2$ , somewhat thicker than the ring  $n$ , is fitted onto the said stud, and the interior of the ring  $n$  is made large enough to fit around the said washer. The thread  $I$  is knotted, as shown, to represent nautical miles, or any other desired measure of distance corresponding to the scale of the chart on which it is used. The thread is made detachable in order that it may be readily changed with changes of charts of different scales, threads

being provided, knotted to correspond with charts of different scales.

In Figs. 4 and 8 is shown a different form of protractor-guide, which may be employed in place of that shown in Fig. 1, if preferred. It consists of a frame,  $J$ , secured to the sleeve  $l$ , and in which is fitted to slide a block,  $m$ , from which projects a hollow stud,  $m'$ , on which is placed the protractor. The block is fitted to slide longitudinally in said frame, the sides of the frame acting as guides working in grooves in the said edges of the said block.

It may sometimes be desirable to employ a straight-edge, either alone or in conjunction with the thread  $I$ . A straight-edge of suitable form, which may be graduated on the scale of the chart, if desired, is shown in Fig. 5, it being forked at one end, so that one edge of the body  $w$  will be in line with the central space between the forks. This, when used, is forked onto the nut  $s^6$  on the hollow stud, before described, and in order that it may be held fixedly in any desired position, I provide the several parts represented in Fig. 7, in which  $m'$  is the hollow stud.  $s$  is a metal bushing fixed in the central opening of the protractor  $F$ .  $s^2$  is a washer around which is the ring  $n$ .  $s^3$  is the straight-edge, forked onto the nut  $s^6$ , provided with a screw-thread on its outside.  $s^4$  is a washer resting on the forks of the straight-edge, and  $s^5$  is a second thumb-nut on the nut  $s^6$ . Into the hollow stud  $m'$  is fitted a short tube provided at its lower end with fine cross-wires to indicate the exact center of the protractor. In place of these wires, a marking-pencil may be fitted into said stud, with its point precisely central, whereby the center of the protractor in any position may be marked on the chart.

It is evident that by either the parallel rules  $G$  or the guide-frame  $J$ , which I regard as their equivalent, the protractor may be guided and readily shifted and placed on any desired point on the chart when the latter is held in the frame  $A$ , as described, without shifting the protractor from its preadjustment with relation to the point of the compass, and to the graphic protractor on the chart.

The frame  $A$  may be provided with a cover, as represented in Figs. 2 and 3, consisting of a frame,  $A'$ , which matches and fits upon the frame  $A$ , and is hinged or otherwise detachably connected therewith. The lower edge of the front side of this cover-frame is raised and the side set inclined, as shown in said drawings, so that the hand may be passed under the cover to manipulate the protractor without exposing the chart to rain or other falling water. The said side may be hinged at its upper edge to the ends of the frame, or it may rest on brackets  $t'$ , or both. A glass plate is secured on the top of this cover-frame, thus closing the same, while leaving the chart and protractor visible.

I provide for lights at the rear side of the frame and cover to illumine the chart in the night. To this end I secure to the frame lamp-



holders, (as many as may be desired,) consisting of a case or box closed with a door, perforated at the bottom for the admission of air, and provided with an opening or chimney at the top. One of these is shown at *u*, Fig. 3. Lamps (the ordinary binnacle-lamp may be used) are placed in these holders, and openings *u'*, preferably glazed, are made in the rear side of the frame, opposite the lamps, through which light may be thrown upon the chart.

To illustrate the manner of using my protractor in navigating a vessel, suppose I desire to find the position of my vessel from the observation of two known objects laid down on my chart—for example, the light-houses *L* and *L'*—I take the compass-bearing of said light-houses, and find that *L* bears northwest and *L'* bears N. N. E., as in Fig. 1. I then adjust the protractor to correct the magnetic variation, if any, from the graphic protractor *P* on the chart, thus making the protractor correspond with the true compass direction. I then adjust the straight-edge upon the protractor at N. N. E., and I may adjust the string at N. W. I then move the protractor until the string *I*, when so drawn across the northwest point on the protractor, falls on the said light-house *L* on the chart, and the straight-edge, so adjusted at N. N. E., falls on the said light-house *L'* on the chart. The center of the protractor is then my true position on the chart. I can now ascertain my distance from the said objects by simply counting the knots on the string and by observing the graduated scale on the straight-edge. Suppose, knowing my position, I wish to ascertain the bearing of any object or place laid down on the chart. I place the center of the protractor, adjusted as before, at the point on the chart corresponding to my known position, and, laying aside the straight-edge, I simply extend the string *I* to the said object on the chart, and the point which the string crosses on the protractor is the compass-bearing of the object, and the knots on the string give me the distance.

In setting the protractor *F* by the graphic protractor *P*, knowing the compass variations at the place where I am, I can readily adjust the protractor to such variation.

The described holder-frame may be made of any desired suitable size or proportions, and, if desired, it may be made extensible by making the ends in two pieces connected by any suitable extension device. The arms of the rules may also be made extensible, if preferred.

It is not my intention to claim here the protractor mounted on the sliding parallel rules, my claim here being for the combination of the same with the chart-holder, as hereinafter more particularly set forth. The claim for such mounted protractor, and the combination therewith of the described straight-edge and swiveled string-holder and string, outside of the combination of said devices, with the described chart-holding frame and rollers, I reserve for a separate application for a patent which it is my purpose to make.

What I here claim, and desire to secure by Letters Patent, is—

1. The combination, with the frame *A*, in which are mounted the rollers *B B'*, adapted to hold and carry a map or chart, of the protractor *F*, mounted on parallel rules that are connected to a rod or bar, *H*, (fixed in said frame,) so as to slide thereon, all as and for the purpose described.

2. The combination, with the frame *A*, in which are mounted the rollers *B B'*, adapted to hold and carry a map or chart, of the protractor *F*, mounted on parallel rules connected to a fixed rod or bar, *H*, so as to slide thereon, and the string *I*, swiveled on the axis of the protractor, as and for the purpose described.

3. The combination, with the frame *A*, in which are mounted the rollers *B B'*, adapted to hold and carry a map or chart, of the protractor *F*, mounted on parallel rules that are connected to a fixed rod or bar, *H*, so as to slide thereon, and the string *I*, provided with measuring-knots, and detachably connected to the arm *n*, that is swiveled on the axis of said protractor, as and for the purpose described.

4. The combination, with the frame *A*, in which are mounted the rollers *B B'*, adapted to hold and carry a map or chart, and which are provided, respectively, with the toothed or ratchet wheels *c* and *c'*, and the weighted pawls *e* and *e'*, of the protractor *F*, mounted on parallel rules connected to a fixed rod or bar, *H*, so as to slide thereon, as and for the purpose described.

5. The combination, with the frame *A*, in which are mounted the rollers *B B'*, adapted to hold and carry a map or chart, of the protractor *F*, mounted on parallel rules connected to the fixed rod *H*, so as to slide thereon, and the straight-edge *I'*, pivoted on the axis of said protractor, as and for the purpose described.

6. The frame *A*, in which are mounted the rollers *B B'*, adapted to hold and carry a map or chart, and on which is fitted the glazed cover *A'*, provided with the glazed openings *u'* and raised side *t*, together with the lamp-holders *u*, as and for the purpose described.

7. The combination, with the frame *A*, on which is mounted, as described, the protractor *F*, of the revolving rollers *B B'*, provided, respectively, with toothed wheels *c c'*, and the counterbalanced pawls *e e'*, which act, when engaged with the said toothed wheels, to prevent the said rollers from rolling over toward the interior of the frame, whereby a map or chart mounted on said rollers may be shifted under the protractor from one roller to the other, and conveniently strained, so as to lie flat and straight on the tablet *C*, all as and for the purpose described.

BAYARD T. PUTNAM.

Witnesses:

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